Kangaroo mother care

Kangaroo mother care (KMC) is a method of care of preterm or low birth weight (LBW) infants by placing them in skin to skin (STS) contact with mother or other caregiver in order to ensure optimum growth and development of the infant. Initially devised as an alternative to conventional technology-based care, KMC is now considered as a standard of care for LBW infants for all settings as an adjunct or alternative to conventional technology based care.

**Benefits of KMC: What is evidence?**

A Cochrane review on benefits of KMC demonstrated that:

- Improved exclusive breast feeding rates at discharge (RR 1.21; 95% CI, 1.08-1.36), at 1-3 months of (RR 1.20; 95% CI: 1.01-1.43) and a trend towards improved rates at 6-12 months (RR 1.29; 95% CI 0.95-1.76)
- Reduction in the risk of mortality (Seven trials, 1614 infants; RR 0.60; 95% CI 0.39-0.93)
- Reduction in nosocomial infection/sepsis (RR 0.42, 95% CI 0.24 to 0.73)
- Reduction in hypothermia (RR 0.23, 95% CI 0.10 to 0.55)
- Reduction in length of hospital stay (mean difference 2.4 days, 95% CI 0.7 to 4.1)

**Components of KMC**

1. **Kangaroo position**
   - The kangaroo position consists of skin-to-skin contact (SSC) between the mother and the infant in a vertical position, between the mother’s breasts and under her clothes
   - The provider must keep herself in a semi-reclining position to avoid the gastric reflux in the infant
   - The kangaroo position is maintained until the infant no longer tolerates it- as indicated by sweating in the baby or baby refusing to stay in KMC position
   - When continuous care is not possible, the kangaroo position can be used intermittently, providing the proven emotional and breastfeeding promotion benefits
   - The kangaroo position must be offered for as long as possible (but at least 1-2 hr/sitting), provided the infant tolerates it well.

2. **Kangaroo nutrition**
   - Kangaroo nutrition is the delivery of nutrition to “kangarooed” infants as soon as oral feeding is possible.
   - Goal is to provide exclusive or nearly exclusive breastfeeding with fortification, if needed.

3. **Kangaroo discharge and follow up**
   - Early home discharge in the kangaroo position from the neonatal unit is one of the original components of the KMC intervention.
   - Mothers at home require adequate support and follow up hence a follow-up program and access to emergency services must be ensured.

**KMC in different settings**

KMC may be used in three different scenarios:

1. **No specialized care for LBW neonates**
   - LBW infants born at home or at first level health facility with no specialized care and no possibility of being transferred to a proper healthcare unit can be provided KMC as the sole modality of care. In such cases, KMC including skin-to-skin contact, breastfeeding and the best
possible health-care follow-up represent the best available means for survival of non-sick premature infants.

2. **Specialized care but limited resources**
   Here KMC represents an effective alternative which allows better utilization of available resources.

3. **Specialized care and adequate resources**
   KMC is used as an adjunct to technology based care to establish healthy bonding between mother and infant and to increase the breastfeeding rates. The intermittent kangaroo position in hospital is the most widely used component in such a setting.

**Requirements for KMC implementation** 6-8

KMC is feasible everywhere, because it is not based on equipment, and it presents advantages for the organization of health services provided the following requirements are met:

1. **Appropriate health facility**
   a. The health facility (the hospital or the neonatal ward) should allow entry of the parents in the neonatal unit at all times.
   b. A room near to or at the neonatal unit, furnished with comfortable seats for the mothers, is needed for KMC practice and for education of mothers and families.
   c. Reclining chairs in the nursery and postnatal wards, and beds with adjustable back rest should be arranged.
   d. Mother can also provide KMC sitting on an ordinary chair or in a semi-reclining posture on a bed with the help of pillows.

2. **Appropriate supporting staff and professionals**
   a. The presence of a nurse available full time, trained in assisting mothers in KMC is indispensable.
   b. Staff should receive adequate training on KMC including on nutrition of LBW infants. Additional training is needed on expression and storage of breast milk, using alternate methods of feeding, and daily monitoring of growth of LBW infants. The training may best be done by exposing them to units already practicing KMC.
   c. Educational material such as information sheets, posters, and video films on KMC in local language should be available to the mothers, families and the community.

3. **Good quality follow-up**
   a. Early discharge in kangaroo position should be not attempted if adequate and appropriate follow up cannot be ensured.
   b. KMC should be provided as an in-hospital activity, allowing mothers and infants to room together for as long as needed.

4. **Institutional, social and community support**
   a. The requirement for a successful KMC program can be summarized in three words: communication, sensitiveness and education.
   b. Apart from supporting the mother, family members should also be encouraged to provide KMC when mother wishes to take rest.
   c. Mother would need her family's cooperation to deal with her conventional responsibilities of household chores till the baby requires KMC.
   d. Community awareness about the benefits should be created. This is particularly important when there are social, economic or family constraints.
Figure 1: Timing of KMC initiation for different birth weight categories.

- Birth weight
  - <1200 gram
    - Most infants suffer from serious morbidities, therefore birth should take place in specialized centres the neonatal
    - May take days to weeks before KMC can be initiated
  - 1200 to 1800 grams
    - Many infants suffer from serious morbidities
    - Transfer to a specialized centre, if possible
    - Best transported in STS with mother / family member
    - May take days before KMC can be initiated
  - >1800 grams
    - Generally stable at birth
    - KMC can be initiated immediately after birth

Most infants suffer from serious morbidities, therefore birth should take place in specialized centres the neonatal period.
Criteria for eligibility of KMC

1. Baby

All stable LBW babies are eligible for KMC. However, sick and very small babies (<1200 gm) needing special care should be cared under radiant warmer initially. KMC should be started after the baby is hemodynamically stable. Short KMC sessions can be initiated during recovery with ongoing medical treatment (IV fluids, oxygen therapy). KMC can be provided while the baby is being fed via orogastric tube or on oxygen therapy. Figure-1 shows the timing of KMC initiation for different birth weight categories.

2. Mother

All mothers can provide KMC, irrespective of age, parity, education, culture and religion.

The following points must be taken into consideration when counselling on KMC:

1. **Willingness**: The mother must be willing to provide KMC. Healthcare providers should counsel and motivate her. Once the mother realizes the benefits of KMC for her baby, she will learn and undertake KMC.

2. **General health and nutrition**: The mother should be free from serious illness to be able to provide KMC. She should receive adequate diet and supplements recommended by her physician.

3. **Hygiene**: The mother should maintain good hygiene: daily bath/sponge, change of clothes, hand washing, short and clean finger nails.

Initiation of KMC

1. **Counseling**
   a. When baby is ready for KMC, arrange a time that is convenient to the mother and her baby.
   b. Demonstrate to her the KMC procedure in a caring and gentle manner and with patience. Answer her queries and allay her anxieties.
   c. Encourage her to bring her mother/mother in law, husband or any other member of the family.
   d. It helps in building positive attitude of the family and ensuring family support to the mother which is particularly crucial for post-discharge home-based KMC.
   e. It is helpful that the mother starting KMC interacts with someone already practicing KMC for her baby.

2. **Mother’s clothing**
   a. Mother can wear any front-open dresses as per local culture. This may include sari, a blouse, front open gown, a suit, or a simple shirt (Figure 2).
   b. KMC can be done with special apparel (such as KEM bag or AIIMS KMC jacket) designed to suit the needs of mothers.
   c. Any other suitable apparel that can retain the baby for extended period of time can be adapted locally.
Figure 2: Mother (A) and father (B) practicing KMC in front open gown and shawl. AIIMS KMC jacket (C) and mother performing KMC using AIIMS KMC jacket (D).

3. **Baby's clothing:** Baby is dressed with cap, socks, nappy, and front-open sleeveless shirt.

**KMC procedure**

1. **Kangaroo positioning (Figure 3):**
   a. The baby should be placed between the mother’s breasts in an upright position.
   b. The head should be turned to one side and in a slightly extended position. This slightly extended head position keeps the airway open and allows eye to eye contact between the mother and her baby.
   c. The hips should be flexed and abducted in a "frog" position; the arms should also be flexed. Baby’s abdomen should be at the level of the mother’s epigastrium. Mother’s breathing stimulates the baby, thus reducing the occurrence of apnea.
d. Support the baby’s bottom with a sling/binder.

![Figure 3: Positioning in KMC]

2. Monitoring
   a. Babies receiving KMC should be monitored carefully especially during the initial stages.
   b. Nursing staff should make sure that baby’s neck position is neither too flexed nor too extended, airway is clear, breathing is regular, color is pink and baby is maintaining temperature.
   c. Mother should be involved in observing the baby during KMC so that she herself can continue monitoring at home.

3. Feeding
   a. The mother should be explained how to breastfeed while the baby is in KMC position.
   b. Holding the baby near the breast stimulates milk production.\(^5\,^6\)
   c. She may express milk while the baby is still in KMC position. The baby could be fed with *paladai*, spoon or tube, depending on the condition of the baby.

4. Duration
   a. Skin-to-skin contact should start gradually in the nursery, with a smooth transition from conventional care to continuous KMC.
   b. Sessions that last less than one hour should be avoided because frequent handling may be stressful for the baby.
   c. The length of skin-to-skin contacts should be gradually increased up to 24 hours a day, interrupted only for changing diapers.
   d. When the baby does not require intensive care, she should be transferred to the postnatal ward where KMC should be continued.

*Can the mother continue KMC during sleep and resting?*\(^7\)

The mother can sleep with baby in kangaroo position in reclined or semi recumbent position about 30 degrees from horizontal (Figure 8). This can be done with an adjustable bed or with pillows on an ordinary bed. A comfortable chair with an adjustable back may be used for resting during the day (Figure 8).
Figure 4: Mother practicing KMC in reclining posture (A) and KMC chair (B)

**Discharge criteria**
The standard policy of the unit for discharge from the hospital should be followed. Generally the following criteria are accepted at most centres:

- Baby’s general health is good
- Gaining weight (at least 15-20 gm/kg/day for at least three consecutive days)
- Maintaining body temperature satisfactorily for at least three consecutive days in room temperature.
- Feeding well and receiving exclusively or predominantly breast milk.
- The mother and family members are confident to take care of the baby

**When to discontinue KMC?**
When the mother and baby are comfortable, KMC is continued for as long as possible, at the institution & then at home. Often this is desirable until the baby’s gestation reaches term or the weight is around 2500 g. She starts wriggling to show that she is uncomfortable, pulls her limbs out, cries and fusses every time the mother tries to put her back skin to skin. This is the time to wean the baby from KMC. Mothers can provide skin-to-skin contact occasionally after giving the baby a bath and during cold nights.

**Post-discharge follow-up**
Close follow up is a fundamental pre-requisite of KMC practice. Baby is followed once or twice a week till 37-40 weeks of gestation or till the baby reaches 2.5 to 3 kg of weight. Thereafter, a follow up once in 2-4 weeks may be enough till 3 months of post-conception age. Later the baby should be seen at an interval of 1-2 months during first year of life. The baby should gain adequate weight (15-20 gm/kg/day up to 40 weeks of post-conception age and 10 gm/kg/ day subsequently). More frequent visits should be made if the baby is not growing well or his condition demands.

**Research priorities**
The research priorities has been provided in Table 1
Table 1: Research issues relevant to Indian context

<table>
<thead>
<tr>
<th>Research question</th>
<th>Subjects</th>
<th>Study design</th>
<th>Interventions</th>
<th>Outcomes to be measured</th>
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</thead>
<tbody>
<tr>
<td>What is effectiveness and safety of KMC in small or sick infants</td>
<td>Small (&lt;1200 gm) or infants with sickness (with respiratory distress, infection, asphyxia, oxygen requirement, intravenous fluids)</td>
<td>RCT</td>
<td>Gp A: KMC Gp B: no KMC (conventional care)</td>
<td>Safety Mortality Hospital stay Confidence of health providers and mothers</td>
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<tr>
<td>Safety and efficacy of KMC in home setting/community setting</td>
<td>Low birth weight neonates after discharge</td>
<td>Cluster RCT</td>
<td>Gp A: KMC Gp B: no KMC (conventional care)</td>
<td>Safety Confidence of mothers Mortality Feedback Questionnaire (incorporating barriers in KMC caregiving)</td>
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<tr>
<td>Identification of barriers (from health facility as well as family and community perspectives) to KMC</td>
<td>Mothers/ KMC caregivers (other family members)</td>
<td>Qualitative research (feedback questionnaire)</td>
<td>-</td>
<td>Feedback Questionnaire (incorporating barriers in KMC caregiving)</td>
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<tr>
<td>Defining monitoring requirements for successful KMC (level of infant monitoring) in small and sick babies</td>
<td>Sick or small (&lt;1500 gm) LBW neonates</td>
<td>Observational studies</td>
<td>KMC with monitoring (HR, Saturation, RR)</td>
<td>Number of episodes of apnea, and desaturation</td>
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<tr>
<td>Defining requirements for successful KMC (such as that of privacy, special attire, chair/cot)</td>
<td>Mothers/ KMC caregivers (other family members)</td>
<td>Qualitative research (feedback questionnaire)</td>
<td>-</td>
<td>Feedback Questionnaire</td>
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References
7. Website of KMC India Network. Guidelines for parents and health providers are available online at www.kmcindia.org.